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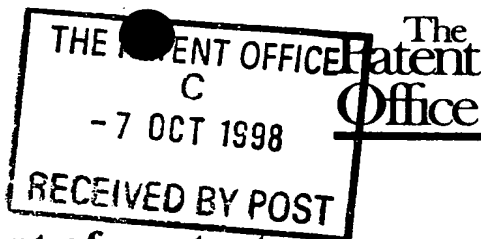
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*Andrew Gersey*

Dated 3 November 1999

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P01/7700 0.00 - 9821736.7

# Request for grant of a patent

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1. Your reference	P22412/LXM/BOU		
2. Patent application number (The Patent Office will fill in this part)	9821736.7		- 7 OCT 1998
3. Full name, address and postcode of the or of each applicant (underline all surnames)	Giltech Limited 12 North Harbour Estate AYR KA8 8AA		
Patents ADP number (if you know it)	4015822 001		
If the applicant is a corporate body, give the country/state of its incorporation	United Kingdom		
4. Title of the invention	"Alginate Foam"		
5. Name of your agent (if you have one)	Murgitroyd & Company		
"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)	373 Scotland Street GLASGOW G5 8QA		
Patents ADP number (if you know it)	1198013		
6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number	Country	Priority application number (if you know it)	Date of filing (day / month / year)
7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application	Number of earlier application		Date of filing (day / month / year)
8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:	YES		
a) any applicant named in part 3 is not an inventor, or b) there is an inventor who is not named as an applicant, or c) any named applicant is a corporate body. See note (d))			

# Patents Form 1/77

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Description 18

Claim(s) -

Abstract -

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Priority documents -

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Statement of inventorship and right to grant of a patent (Patents Form 7/77) -

Request for preliminary examination and search (Patents Form 9/77) -

Request for substantive examination (Patents Form 10/77) -

Any other documents -  
(please specify)

11. I/We request the grant of a patent on the basis of this application.

Signature *Murgitroyd & Co*  
Murgitroyd & Company

Date 6.10.1998

12. Name and daytime telephone number of person to contact in the United Kingdom

Beverley Ouzman

0141 307 8400

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1     FOAM

2

3     The present invention is concerned with a foamable  
4     formulation and the foam formed therefrom.

5

6     A wide variety of gels, creams, ointments, lotions and  
7     other formulations are available for application to a  
8     body surface. The exact content of these compositions  
9     will vary depending upon the purpose of application.  
10    For example, a formulation may be applied to clean a  
11    body surface, to promote healing of any wound or  
12    injury, to prevent an exposed wound on the body from  
13    drying out, to prevent infection, etc. In certain  
14    circumstances the composition may include an active  
15    ingredient.

16

17    In our International Patent Application published 13  
18    June 1996 under No WO-A-96/17595 we describe a foamable  
19    formulation which comprises a foamable carrier or  
20    gelling agent, for example an alginate gel, and an  
21    active ingredient, such as a water soluble glass  
22    powder.

23

24    The product described in WO-A-96/17595 represented a  
25    considerable advance over the use of gel or cream.

---

1 We have now found that by including a precipitant for  
2 the gelling agent, in a slow-release form within the  
3 composition, further improvements with regard to the  
4 setting time of the foam and its stability can be  
5 achieved. In particular, the added stability enables a  
6 pre-foamed pad to be sterilised by irradiation or other  
7 conventional means.

8  
9 Thus, the present invention provides a formulation  
10 comprising a foamed gelling agent admixed with a slow-  
11 release precipitant therefor. The gelling agent may be  
12 any agent capable of forming a foam, although  
13 preferably the gelling agent is physiologically  
14 compatible and non-irritant when maintained in contact  
15 with the body surface. The gelling agent may be a gel,  
16 for example a sodium alginate gel, carageenan gel,  
17 sodium carboxymethylcellulose gel or mixtures thereof.

18  
19  
20 The precipitant is desirably intimately admixed  
21 throughout the whole of the foamed gelling agent,  
22 preferably during the foaming process. In certain  
23 circumstances however the presence of the precipitant  
24 on one surface of the foamed gelling agent may be  
25 sufficient to cause stabilisation of the foam.  
26 Examples of precipitants include stabilising  
27 crosslinking agents which render the gelling agent  
28 insoluble. Examples include polyvalent metal ions of  
29 calcium, zinc, copper, silver or aluminium as well as  
30 borates, glyoxal and amino-formaldehyde precondensates.

31  
32 The role of the precipitant is to stabilise the foamed  
33 gel so that a stable foam is produced. Generally, the  
34 stable foam should be produced within a reasonable time  
35 period since if the precipitant is too slow-acting, the  
36 foam structure will have collapsed prior to

1 stabilisation. However, a very fast acting precipitant  
2 may not allow sufficient time for the admixed gel to be  
3 foamed. Desirably, the precipitant stabilises the gel  
4 over a time period of 1 minute to 120 minutes,  
5 preferably within 30 minutes. The solubility of the  
6 precipitant and hence the setting time of the foam may  
7 be varied by adjusting the pH of the composition  
8 especially where the precipitant is based upon a  
9 calcium salt. Generally, the solubility of a calcium  
10 salt will be increased by lowering the pH. Typical pH  
11 adjusters include organic acids such as acetic, adipic,  
12 citric, fumeric, lactic and tartaric acids.

13  
14 Suitable precipitants include calcium citrate, calcium  
15 carbonate, calcium phosphate, calcium hydrogen phosphate  
16 ( $\text{CaHPO}_4$ ), barium carbonate, barium phosphate, barium  
17 sulphate, barium chloride and zinc carbonate.

18  
19 Where the gelling agent comprises an alginate gel, a  
20 carageenan gel or a carboxymethylcellulose gel one  
21 preferred precipitant is a calcium salt. Whilst  
22 calcium citrate has been used in the examples, other  
23 slowly dissolving calcium salts are also suitable.

24  
25 Where the gelling agent comprises  
26 carboxymethylcellulose gel one preferred precipitant is  
27 an aluminium salt.

28  
29 In one embodiment the gelling agent and precipitant are  
30 packaged separately and only admixed during the foaming  
31 process or subsequent to foaming.

32  
33 Optionally, the formulation may comprise other  
34 ~~additives such as decompactants which promote the~~  
35 desired foam structure or other foaming agents,  
36 plasticisers, humectants, preservatives, additives,

1 sequestering agents or active ingredients such as  
2 antimicrobial agents, growth factors, hormones, living  
3 cells, etc.

4

5 The foam may be applied directly to the body area and  
6 allowed to produce a stable foam protective cover, for  
7 example over a wound.

8

9 Alternatively, the foam can be produced onto a mould or  
10 other surface area, allowed to cure and then applied to  
11 the body surface. Optionally, the foam may be applied  
12 about a substrate (for example cloth, mesh, non-woven  
13 pad of alginate fibres, nylon, rayon, polylactid acid,  
14 polyglycolic acid, polycaprolactone or biocompatible  
15 glass fibres) which are then integrated into the foam  
16 pad produced.

17

18 As an example, the foam may be used to treat  
19 dermatological conditions (including psoriasis, atopic  
20 and allergic eczema). It may be convenient in this  
21 embodiment for the foam to deliver an active ingredient  
22 normally used to alleviate such conditions, for example  
23 a steroid such as hydrocortisone.

24

25 In another embodiment the foam may be used to treat  
26 burns or scalds, including sunburn.

27

28 In another embodiment the foam may be applied  
29 cosmetically, and for example may include skin  
30 moisturising agents, nutritional agents and growth  
31 factors suitable to promote skin regeneration. A foam  
32 intended for cosmetic use may include colorants or  
33 pigments so that the foam may be applied to the skin as  
34 a cosmetic or to disguise any blemishes in the skin.

---

35

36 The foam may be used prophylactically. In particular a

1 foam containing a UV blocking agent may be applied to  
2 exposed areas of the skin to protect it from the  
3 effects of the sun.  
4

5 The formulation of the invention is applied to the body  
6 site of interest in the form of a foam and it is  
7 therefore essential that the composition undergoes a  
8 foaming process before application to the body. In the  
9 foaming process gas is forced into or is formed within  
10 the formulation to entrap small bubbles of gas therein,  
11 thereby forming the foam. Any suitably gas or gas  
12 producing system can be used to produce the foam.  
13 Mention may be made of butane and nitrous oxide, but  
14 other gases like air, nitrogen, hydrofluorocarbons such  
15 as HFC134a or 227, hydrocarbons like propane,  
16 isopropane or a mixture thereof, are also suitable.  
17 Conveniently the foam may be produced by conventional  
18 means such as by using aerosol technology.  
19

20 The formulation according to the present invention may  
21 be stored in any convenient container until required.  
22 Generally, the container will be designed to preserve  
23 the sterile nature of the formulation. Conveniently  
24 the container will be provided with means to foam the  
25 composition when required. Details are given in WO-A-  
26 96/17595.  
27

28 Generally, the foam will be produced from sterile  
29 ingredients.  
30

31 Prior to the foaming process, the foamable carrier is  
32 preferably in the form of a gel. The gel may be  
33 sterilised and this is generally desirable where the  
34 ~~foam is intended for medical use. Usually,~~

---

35 sterilisation will take place by autoclaving the  
36 formulation, since this is currently the most economic

1 means of achieving sterilisation. Autoclaving at  
2 temperatures of from 100°C to 125°C for under ½ hour is  
3 normally sufficient. Generally, the autoclaving  
4 process should be as mild as possible, whilst being  
5 sufficient to sterilise the formulation. For example,  
6 autoclaving at temperatures of about 121°C for 15-20  
7 minutes is acceptable. The autoclaved formulation may  
8 then be foamed when cool. It is also possible,  
9 however, to sterilise the formulation by other means,  
10 for example by  $\gamma$ -irradiation or e-beam irradiation. It  
11 has been found that autoclaving the gel may cause the  
12 MW of the foamable carrier to be slightly reduced.  
13 Consequently it may be desirable to select a foamable  
14 carrier having a higher MW than that ultimately  
15 required.

16  
17 The foam forms an air-tight cover around any wound or  
18 injury to which it is applied, and this prevents that  
19 area from drying out and may also combat infection.  
20 The advantages of applying a topical product in the  
21 form of a foam include:

- 22
- 23 1. Easy rapid application,
  - 24 2. Conforms to surface irregularities,
  - 25 3. Insulates the wound,
  - 26 4. Cools the tissues,
  - 27 5. Offers antibacterial action to prevent
  - 28 infection,
  - 29 6. Biocompatibility with tissue,
  - 30 7. Suitable for use as a vehicle for the
  - 31 administration of pharmaceutical agents,
  - 32 and/or
  - 33 8. Maintains a moist environment.
- 34

---

35 Generally, the formulation of the present invention  
36 will be applied directly to the body site of interest

1 in the form of a foam, the foam being produced from any  
2 suitable device (such as an aerosol) immediately before  
3 application. It is, however, possible for a quantity  
4 of the foamed formulation to be produced and then  
5 applied onto the body site by any suitable means, for  
6 example by hand or by spatula. This method may be  
7 required for wounds having a narrow opening.

8  
9 As stated above, the foam may also be produced on a  
10 suitable surface and then dried to produce the foam  
11 sheet described above. Generally, the production of  
12 the sheet will take place under sterile conditions or  
13 may be sterilised after production. In the prior  
14 described foam product of WO-A-96/17595, it was not  
15 possible to provide a foamed pad product and then  
16 sterilise the pad by conventional means such as  $\gamma$ -  
17 irradiation, since it was found that the foam structure  
18 deteriorated during sterilisation. With the inclusion  
19 of the precipitant however, sterilisation of the  
20 pad is possible both by  $\gamma$ -irradiation, ethylene oxide  
21 sterilisation or other conventional means. This  
22 represents a very considerable advantage over the prior  
23 art product. Optionally the manufacture of a  
24 prefoamed product may envisage a continuous foaming  
25 process. The sheet may be divided into a convenient  
26 size and may be packaged. Optionally the foam sheet  
27 may be produced on contoured surface so that it is  
28 moulded to a pre-determined shape.

29  
30 Examples of suitable foamable carriers for use in the  
31 composition of the present invention include (but are  
32 not limited to) alginate and derivatives thereof,  
33 carboxymethylcellulose and derivatives thereof,  
34 collagen, polysaccharides (including, for example,  
35 dextran, dextran derivatives, pectin, starch, modified  
36 starches such as starches having additional carboxyl

1 and/or carboxamide groups and/or having hydrophillic  
2 side-chains, cellulose and derivatives thereof), agar  
3 and derivatives thereof (such as agar stabilised with  
4 polyacrylamide), carageenan, polyethylene oxides,  
5 glycol methacrylates, gelatin, gums such as xanthum,  
6 guar, karaya, gellan, arabic, tragacanth and locust  
7 bean gum. Also suitable are the salts of the  
8 aforementioned carriers, for example, sodium alginate.  
9 Mixtures of any of the aforementioned carriers may also  
10 be used, as required.

11  
12 Preferred foamable carriers include alginate,  
13 carageenan, carboxymethylcellulose, the derivatives and  
14 salts thereof and mixtures of any of these. Alginate  
15 (the derivatives or salts thereof, such as sodium and  
16 calcium alginate) are especially preferred. Foamable  
17 carriers having a molecular weight of from 10,000 to  
18 200,000 kDa are preferred, especially over 100,000 kDa,  
19 for example 150,000 to 200,000 kDa, may be used.

20  
21 The formulation may further comprise a foaming agent,  
22 which promotes the formation of the foam. Any agent  
23 having a surfactant character may be used. The  
24 surfactants may be cationic, non-ionic or anionic.  
25 Examples of suitable foaming agents include cetrimide,  
26 lecithin, soaps, silicones and the like. Commercially  
27 available surfactants such as Tween™ are also suitable.  
28 Cetrimide (which additionally has an anti-bacterial  
29 activity) is especially preferred.

30  
31 The formulation of the present invention (and thus the  
32 foam) may be used to deliver pharmaceutically active  
33 agents, in particular to deliver such agents in a  
34 controlled release manner. Mention may be made of:

---

35  
36 Antiseptics, Antibacterials and Antifungal agents,

1 such as Chlorhexidine, acetic acid, polynoxylin,  
2 povidone iodine, mercurochrome phenoxyethanol,  
3 acridene, silver nitrate, dyes eg brilliant green,  
4 undecanoic acid, silver sulphadiazine, silver  
5 proteins and other silver compounds,  
6 metronidazole, benzaclonium chloride;

7  
8 Nutritional agents, such as vitamins and proteins;

9  
10 Growth factors and healing agents, including  
11 Ketanserin a serotonomic blocking agent;

12  
13 Living Cells;

14  
15 Enzymes include streptokinase and streptodormase;

16  
17 Elements - zinc, selenium, cerium, copper,  
18 manganese, cobalt, boron, arsenic, chromium  
19 silver, gold, gallium;

20  
21 Charcoal;

22  
23 Desloughing and Debriding agents such as  
24 hypochlorite and hydrogen peroxide;

25  
26 Astringents including potassium permanganate;

27  
28 Antibiotics exemplified by neomycin and framycetin  
29 sulphate, sulfamylon, fusidic acid, mupirocin,  
30 bacitracin, gramicidin.

31  
32 In addition the formulation of the present invention  
33 may further comprise other conventional additives such  
34 as plasticisers and humectants (such as glycerol,  
35 propan -1,2-diol, polypropylene glycol and other  
36 polyhydric alcohols), free radical scavengers to

1 stabilise against the effects of sterilisation by  
2 irradiation, viscosity-adjusting agents, dyes and  
3 colorants, and the like.

4  
5 Several experiments including comparatives tests have  
6 been achieved by the Applicant in order to demonstrate  
7 some of the advantages of the new compositions of the  
8 invention. Of course the embodiments described  
9 hereinbelow are submitted in order to better described  
10 the invention and not to limit its scope.

11  
12  
13 EXAMPLE 1

14 PROCEDURE FOR MANUFACTURE OF UNIT BATCH (100 g) of  
15 ALGINATE GEL

16  
17 Typically the alginate gels are made according to the  
18 following process:

- 19 1. De-ionised (DI) water is measured and poured  
20 into mixing vessel 1.
- 21 2. Desired amounts of suitable alginate (for  
22 example Keltone) and glycerine are weighed  
23 using a calibrated balance, reading to 2  
24 decimal places.
- 25 3. Alginate and glycerine are mixed together in a  
26 beaker until no lumps remain.
- 27 4. The whole alginate/glycerine mix is added very  
28 slowly to the water.
- 29 5. Once all the alginate/glycerine has been added to  
30 the water, the mixture is stirred until a smooth  
31 gel has formed.

32  
33 Several different alginate gels have been made  
34 according the above process. They differ and are  
35 referred to by the amount of alginate (for example  
36 Keltone) used. For example the alginate gel code 6½ has

the following composition:

GEL CODE	6½
DI Water	80 ml
Glycerine	25.22 g
Keltone	6.5 g
Unit Batch Wt	111.72 g

The above composition can be varied to include other weights of alginate, which would be reflected in the gel code number. For example a composition having 8g alginate (plus 80ml DI water and 25.22g glycerine) would have gel code 8. Analogous gel codes are used when other gel formers (eg carageenan or CMC) are substituted for the alginate in the above composition.

#### PROCEDURE FOR FOAM PRODUCTION

The propellant used to produce the foam can be compressed gases such as air, nitrogen, nitrous oxide or air, hydrofluorocarbons such HFC134a or 227 or hydrocarbons including propane, isopropane, n-butane, isobutane and 2-methylbutane.

Propellant vapour pressure can range from 0 to 110 PSIG at 70°C although the preferred range is 20 to 70 PSIG. Values within this range can be achieved for example by blending the three hydrocarbons propane, isobutane and butane. Calor Aerosol Propellants (CAP) sold by Calor Gas Ltd Slough may be used as propellant gas, when a blend of propane, isobutane and butane is used the proportions can be as follows:

	<u>Grade</u>	<u>Propane %</u>	<u>Isobutane %</u>	<u>n Butane%</u>
1	CAP 30	11	29	60
2	CAP 40	22	24	54
3	CAP 70	55	15	30

5

6 A foam according to the invention can advantageously be  
7 produced following the following process:

- 8 1. 100 g of a gel according to the invention is  
9 poured to an aerosol cannister.
- 10 2. 2.5 g of calcium citrate (food grade) is  
11 added to the cannister.
- 12 3. A valve is crimped onto the cannister.
- 13 4. Air is purged from the cannister.
- 14 5. 4.5 g of propellant gas is added into the  
15 cannister (65:35 CAP 40 : Isopentane  
16 propellant) and an actuator is positioned on  
17 the valve.
- 18 6. The cannister is shaken vigorously for 20-30  
19 seconds.
- 20 7. the cannister is inverted and the foam dispensed.

21

## 22 EXAMPLE 2

23 Using a range of water-based gel formulations detailed  
24 below tests were done to improve the "setting" time and  
25 stability of the gel and its foam.

26

27 Preferred alginate compositions have an amount of  
28 Keltone ranging from 5-9g in the composition set out in  
29 Example 1.

30

31 Experiment 1. Gel Code 6½ Alginate gel and foam mixed  
32 with calcium citrate compared to Gel Code 6½ alginate  
33 gel alone

34

---

## 35 Foamed gel with calcium citrate

36 2.5 g calcium citrate was added to 100 g of gel and the

1 foamed gel was spread out onto plastic sheeting. The  
2 resultant foam pad was liftable in 15 minutes.

3

4 Foamed gel without calcium citrate

5 The above experiment was reproduced by foaming the gel  
6 on its own as described above. The "setting" time of  
7 the foam was 10 hours.

8

9 The experiments were repeated using 100 g unfoamed gel  
10 with and without calcium citrate. Similar setting  
11 times to those observed for the foamed gels were  
12 obtained (15 minutes and 10 hours respectively) before  
13 the gel pads were liftable.

14

15 Conclusion: Calcium citrate speeds up and controls the  
16 setting time of the gel and the foam.

17

18 Experiment 2. Gel Code 8 Alginate gel mixed with water  
19 soluble glass (WSG) containing phosphate and boron  
20 compared to gel code 8 alginate gel alone.

21

22 The WSG was comprised as follows:

23 28.5M% CaO

24 3M% Ag

25 5M% B<sub>2</sub>O<sub>3</sub>

26 18.5M% MgO

27 45M% P<sub>2</sub>O<sub>5</sub>

28

29 Foamed gel with WSG

30 2.5 g of WSG was mixed with 100 g gel and the foamed  
31 mixture was spread out onto plastic sheeting. The  
32 resultant foam pad was liftable in 120 mins.

33

34 Foamed gel without WSG

---

35 The above experiment was repeated by foaming the gel on  
36 its own. The "setting" time of the foam was

1 approximately 10 hours.

2

3 The experiments were repeated using 100 g unfoamed gel  
4 with and without WSG. Similar setting times to those  
5 observed for the foamed gels were obtained (120 minutes  
6 and 10 hours respectively) before the gel pads were  
7 liftable.

8

9 Conclusion: WSG speeds up and controls the setting  
10 time of the gel and the foam.

11

12 Experiment 3. Gel Code 4 Carageenan gel mixed with  
13 calcium citrate compared to gel code 4 gel alone

14

15 Foamed gel with calcium citrate

16 3 g of calcium citrate was mixed with 100 g gel and the  
17 foamed mix was spread out onto plastic sheeting. The  
18 resultant foam pad was liftable in 120 mins.

19

20 Foamed gel without calcium citrate

21 The above experiment was repeated by foaming gel on its  
22 own as described above. The "setting" time of the foam  
23 was 10 hours.

24

25 The experiments were repeated using 100 g unfoamed gel  
26 with and without calcium citrate. Similar setting  
27 times to those observed for the foamed gels were  
28 obtained (120 minutes and 10 hours respectively) before  
29 the gel pads were liftable.

30

31 Experiment 4. Gel Code 4½ Carageenan gel and gel code  
32 6½ alginate gel mixed with calcium citrate compared to  
33 gel code 4½ carageenan gel and gel code 6½ alginate gel  
34 alone

---

35

1

2 Foamed gel with calcium citrate

3 2.5 g of calcium citrate was mixed with (50 g alginate  
4 and 50 g carageenan) gel and the foamed mix was spread  
5 out onto plastic sheeting. The resultant foam pad was  
6 liftable in 15 mins.

7

8 Foamed gel without calcium citrate

9 The above experiment was repeated by foaming the mixed  
10 gel on its own. The "setting" time of the foam pad was  
11 10 hours.

12

13 The experiments were repeated using 100 g unfoamed gel  
14 with and without calcium citrate. Similar setting  
15 times to these observed for the foamed gels were  
16 obtained (120 minutes and 10 hours respectively) before  
17 the gel pads were liftable.

18

19 **Experiment 5. Gel Code 6½ Alginate gel mixed with**  
20 **calcium citrate and added bentone IPM gel**

21

22 2.5 g calcium citrate was added to 100 g of gel with 1g  
23 bentone IPM gel, admixed in an aerosol cannister and  
24 dispensed therefrom as a foam onto a plastic surface.  
25 The resultant foam pad was liftable in 12 minutes.  
26 Bentone IPM gel is an admixture of isopropyl myristate,  
27 sterealkonium hectorite and propylene carbonate.

28

29 **Conclusion:** Calcium citrate and bentone gel control  
30 the setting time of the foam. Bentone gel also acts as  
31 a reological agent and assists in the smoothness of  
32 delivery from the can.

33

---

1  
2 **Experiment 6. Gel Code 6½ Alginate gel mixed with**  
3 **calcium citrate and added cetrinide**  
4

5 2.5 g calcium citrate was added to 100 g of alginate  
6 gel with 1g cetrinide in an aerosol cannister and  
7 foamed onto a plastic surface. The resultant foam pad  
8 was liftable in 15 minutes.  
9

10 **Conclusion:** Calcium citrate speeds up the setting time  
11 of the foam. Cetrinide increases the cell structure of  
12 the product.  
13

14 **Experiment 7. Gel Code 6½ Alginate gel mixed with**  
15 **calcium citrate and added Tween 20**  
16

17 2.5 g Calcium citrate was added to 100 g of alginate  
18 gel with 1g Tween 20 and foamed onto a plastic surface.  
19 The resultant foam pad was liftable in 12 minutes.  
20

21 **Conclusion:** Calcium citrate speeds up the setting time  
22 of the gel. The additive Tween 20 gave a much smoother  
23 delivery and an airier foam. Tween 80, 60 and 40 were  
24 also tried and all assisted in the delivery and product  
25 cell structure.  
26

27 **Experiment 8. Gel Code 4 Carboxymethyl cellulose and gel**  
28 **code 6½ alginate gel mixed with calcium citrate**  
29 **compared to the gel alone**  
30

31 2.5 g calcium citrate was added to (50 g CMC & 50 g  
32 alginate gel) and then the mixture was foamed onto a  
33 plastic surface. The resultant foam pad was liftable  
34 in 25 minutes. The gel foamed on its own was liftable  
35 overnight (approx. 10 hours).  
36

1 Experiment 9. Gel Code 4 Carboxymethyl cellulose gel  
2 mixed with aluminium chloride compared with the gel  
3 alone  
4

5 2 g aluminium chloride was mixed with 100 g CMC gel.  
6 The gel was spread onto a plastic surface. The  
7 resultant gel was liftable instantly. The gel alone was  
8 liftable overnight (approx. 10 hours).  
9

10 Experiment 10. Gel Code 6 Alginate gel mixed with  
11 citric acid compared to gel code 6 alginate gel alone  
12

13 2.5 g of citric acid was mixed with 100 g alginate gel  
14 and the mix was spread out onto plastic sheeting. The  
15 resultant gel pad was liftable in 120 mins. 100 g of  
16 the gel alone was spread onto plastic sheeting and the  
17 resultant pad was only liftable overnight (approx. 10  
18 hours).  
19

20 Experiment 11. Gel Code 6½ Alginate gel was mixed with  
21 the following powders on a 100 g gel: 2.5 g powder  
22 basis

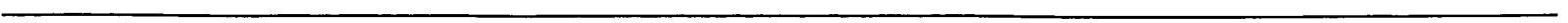
Powder	Results as a gel	Results as a foam
Calcium Chloride	Gel pad was formed instantly	Fast setting foam
Calcium Sulphate	Gel pad formed reasonably quickly	Foam set reasonably quickly
Aluminium Chloride	Gel pad formed instantly	Fast setting foam
Calcium Metaborate	Gel pad formed instantly	Fast setting foam

Experiment 12. Setting performances of a foam of a gel code 6½ alginate gel as a function of the amounts of calcium citrate.

Batch No	Amount of calcium citrate per 100 g gel	Result
DM02 210798	4 g	Not dispensed - set in can
DM03 210798	3 g	Very difficult to dispense. 9½ minutes to set.
DM04 210798	2.5 g	Easier to dispense than above. 18½ minutes to set
DM05 210798	2.25 g	Taking longer to set. 20 minutes.
DM02 200798	2 g	Setting time - 40 minutes

Experiment 13. Gel Code 6½ alginate gel with calcium vibrate and isopertrane.

100g gel code 6½ alginate gel was admixed with varying amounts of calcium citrate (2 to 4g), added to isopentane and mixed thoroughly before being spread onto a glass sheet. The isopentane vaporises at ambient temperatures and boils off through the gel leaving a foam pad of similar consistency to those produced by dispersion from an aerosol can. After half-an-hour the foam pads were liftable.



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